

REMARKS

Claims 1 and 3-32 are pending in the present application. Claims 1-32 are rejected. Claim 2 is herein canceled. Claims 1, 3 and 9 are herein amended. No new matter has been presented.

Claim Rejections - 35 U.S.C. §102(b)

Claims 1, 4, 5, and 7 are rejected under 35 U.S.C. §102(b) as being anticipated by Sudou et al. (JP 2002-303618).

Claims 9, 12-17, 21 and 23 are rejected under 35 U.S.C. §102(b) as being anticipated by Omatsu et al. (US 2001/0054374).

Claim Rejections - 35 U.S.C. §103(a)

Claim 6 is rejected under 35 U.S.C. §103(a) as being unpatentable over Sudou et al. The Examiner concludes that it would have been obvious to combine the use of an anthraquinone dye with the triarylmethane dye in order to realize the desired color attributes of the indicator.

Claims 2, 3, and 8 are rejected under 35 U.S.C. §103(a) as being unpatentable over Sudou et al. as applied to claims 1 and 7 above, and further in view of Omatsu et al. The Examiner concludes that it would have been obvious to employ a cationic dye in the composition of Sudou et al. because one would have found it obvious to add a non-color changing layer to the indicator of Sudou et al.

Claim 22 is rejected under 35 U.S.C. §103(a) as being unpatentable over Omatsu et al. The Examiner asserts that although Omatsu et al. is silent with respect to cracks specifically in the layer, it is known in the art that “cracks” often appear when printing dyes to substrates, forming as the ink dries.

Claims 10, 11 and 20 are rejected under 35 U.S.C. §103(a) as being unpatentable over Omatsu et al. as applied to claim 9 above, and further in view of Sudou et al. The Examiner concludes that it would have been obvious to use an amide known in the art as being an effective resin in indicator dye compositions.

Claims 18, 19 and 24-26 are rejected under 35 U.S.C. §103(a) as being unpatentable over Omatsu et al. as applied to claims 9 and 21 above, and further in view of Lippold et al. (US 6,410,338). The Examiner concludes that it would have been obvious to add the indicator of Lippold et al. to Omatsu et al. in order to provide a chemical indicator with redundancy.

Claims 27-32 are rejected under 35 U.S.C. §103(a) as being unpatentable over Omatsu et al. in view of US 6,267,242 to Nagata et al. The Examiner concludes that it would have been obvious to use the indicator of Omatsu et al. within a gas-permeable bag, as disclosed by Nagata et al.

Client Action and Argument

Applicants herein amend claim 1 to clarify the invention. The amendment incorporates the content of original claim 2 into the original claim 1. Thereafter, Applicants disagree with the rejection because the cited combination of references fails to teach or suggest all of the critical

claimed limitations of the invention. Furthermore, the result of the claimed invention would not have been expected based on the cited combination of references.

Applicants note that the present invention is directed to an ink composition for detecting an oxidizing gas, comprising at least one selected from the group consisting of azo dye, methine dye, triarylmethane dye and thiazine dye, and a cationic surfactant. Such an ink composition has superior stability without returning to the original color after changing color, and is able to reliably detect that an oxidizing gas treatment has been carried out.

The effects of the present invention such as the above can be further clarified with reference to Examples 1 to 18 of the present specification and by further reference to Comparative Experimental Examples 1 to 5 of the attached declaration. Table 1 in the attached declaration summarizes the results of Examples 1, 3, 4, 5 and 8 of the present specification, and Comparative Experimental Examples 1 to 5 of the attached declaration.

As is clear from Table 1, the products obtained in Examples of the present application, in which a cationic surfactant was added, underwent a sufficient color change upon exposure to both ozone and hydrogen peroxide gas. In contrast, the products obtained in Comparative Experimental Examples 1 to 5, in which a cationic surfactant was not added, did not undergo a sufficient color change; although some products underwent a color change, the color change occurred only upon exposure to either ozone or hydrogen peroxide gas, and took a considerably long time therefor.

As explained above, it is clear that the ink composition according to present invention 1 undergoes a sufficient color change upon exposure to both ozone and hydrogen peroxide gas **only when the ink composition comprises a combination of a cationic surfactant and at least one member selected from azo dye, methine dye, triarylmethane dye and thiazine dye.** Such an ink composition makes it possible to visually confirm whether both a process of introducing hydrogen peroxide of a plasma sterilization treatment and a process of generating plasma from the hydrogen peroxide have been properly performed, by observing the color change before and after the sterilization.

The Examiner rejects claim 2 (now included in claim 1) over Sudou et al. as applied to claims 1 and 7 above, and further in view of Omatsu et al. The Examiner concludes that it would have been obvious to employ a cationic dye in the composition of Sudou et al. because one would have found it obvious to add a non-color changing layer to the indicator of Sudou et al.

Applicants note that Sudou et al. discloses an indicator for plasma sterilization, comprising a binder and a compound, which undergoes a change in hue according to pH change. Sudou et al. discloses, as examples of the compounds that undergo a change in hue according to pH change, sulphophthalein compounds, naphtholphthalein compounds, phenolphthalein compounds, and the like. However, Sudou et al. is silent with respect to the use of a surfactant.

The Examiner asserts that because Omatsu et al. discloses the use of a surfactant, it would have been obvious for a skilled artisan to arrive at the invention set forth in claim 2 by combining these references.

Omatsu et al. discloses a plasma sterilization indicator comprising, on a support, a color-change layer comprised of a variable-color ink composition containing an anthraquinone dye having at least one amino group selected from the group consisting of primary amino groups and secondary amino groups. According to the invention disclosed in Omatsu et al., “a still higher detection sensitivity can be obtained by using such a cationic surfactant in combination with said anthraquinone dye”, as disclosed in paragraph [0025]

Accordingly, Omatsu et al. discloses only a particular combination of an anthraquinone dye and a cationic surfactant. In view of this, a person skilled in the art would not usually combine the invention of Omatsu et al. with that of Sudou et al., which does not disclose anthraquinone dyes.

As noted above, claim 1 achieves remarkable effects of undergoing a sufficient color change upon exposure to both ozone and hydrogen peroxide only by the use of a specific combination of a cationic surfactant and at least one member selected from azo dye, methine dye, triarylmethane dye and thiazine dye. On the other hand, Sudou et al. and Omatsu et al. do not disclose or suggest such a specific combination, and obviously do not disclose or suggest the effects obtainable by the specific combination. Therefore, even if the cited references are combined, a person skilled in the art would not arrive at the invention of claim 1, which achieves the remarkable effects mentioned above.

Accordingly, the present invention 1 is inventive over Sudou et al. and Omatsu et al.

The invention as defined in claim 9 of the present application is directed to an ink composition for detecting hydrogen peroxide plasma sterilization, comprising:

- 1) at least one selected from the group consisting of azo dye and methine dye;
- 2) a nitrogen-containing polymer; and
- 3) a cationic surfactant.

As disclosed in the present specification, the ink composition for detecting hydrogen peroxide plasma sterilization of the present invention achieves a desired color change effect even within a pouch for hydrogen peroxide plasma sterilization treatment only when the ink composition comprises, as essential components, azo dye, methine dye, a nitrogen-containing polymer and a cationic surfactant.

Such remarkable effects of present invention 9 can be further clarified by comparing the Examples and Comparative Examples shown in Table 2 of the present specification. Specifically, a sufficient color difference is observed in Examples 1 to 18, whereas in Comparative Examples 1 and 5 to 7, in which a nitrogen-containing polymer was not added, and in Comparative Examples 2 and 4, in which a surfactant was not added, a sufficient color change before and after sterilization was not observed.

As is clear from the results above, the present invention 9 achieves a desired color change effect even within a pouch for hydrogen peroxide plasma sterilization treatment only when the ink composition of present invention 9 comprises, as essential components, azo dye, methine dye, a nitrogen-containing polymer and a cationic surfactant.

The Examiner rejects claim 9 because Omatsu et al. discloses anthraquinone dyes, cationic surfactants, and amide resins. Applicants herein amend claim 9 to delete the “anthraquinone dye”. Therefore, Applicants submit that the rejection is overcome.

As noted above, Omatsu et al. does not disclose dyes other than the anthraquinone dyes. Further, Sudou et al. also does not disclose or suggest azo dyes or methine dyes. Omatsu et al. and Sudou et al. neither disclose nor suggest the effects obtainable by the specific combination. Therefore, even if the invention of Sudou et al. is combined with that of Omatsu et al., a person skilled in the art would not arrive at, based on these cited references, which do not disclose or suggest azo dyes or methine dyes, the present invention 9, which achieves remarkable effects with the use of the ink composition comprising the specific composition.

Accordingly, claim 9 is novel over Sudou et al. and Omatsu et al., and is also over combination of these cited references.

Additionally, amended claims 3 to 8 and claims 10 to 32 depend on claim 1 and/or 9, which are herein shown to be patentably distinct. Therefore, the inventions set forth in claims 3 to 8 and original claims 8 to 11 are also patentably distinct.

In view of the aforementioned amendments and accompanying remarks, Applicants submit that the claims, as herein amended, are in condition for allowance. Applicants request such action at an early date.

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants’ undersigned attorney to arrange for an interview to expedite the disposition of this case.

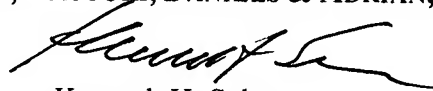
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If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

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Enclosure: Declaration under 37 C.F.R. § 1.132